The first thing you should notice about this problem is that if we try to take 1000 apples directly from town A to town B we will be left with no apples at our destination. This is obvious, as we have to travel a distance of 1000 miles and we lose 1 apple per mile we travel.

What if we instead consider the case of dropping the apples off as we go along our journey. Let's consider the naive case that we stop halfway between town A and town B to drop the apples. We'll call this midway point town A' The steps would be as follows:

1. Load 1000 apples into our truck and drive to A'. At this point, we've lost 500 apples and we'll deposit the remaining 500 apples at A'.
2. Now we travel back to town A to retrieve the next 1000 apples. This time, we take these apples back to A' and deposit the 500 that have not been eaten.
3. Finally, we repeat this procedure for the last batch of 1000 apples.
4. Now we have 1500 apples at A'. We'll take 1000 of these apples and take them to town B leaving us with 500 apples at the destination. Finally, we go back to get the remaining 500 apples from A' and transport them to town B giving us 250 additional apples.

Following these steps, we're left with a total of 750 apples. So clearly, we've demonstrated that stopping along the journey allows us to have some apples reach the final destination. But is this the maximum number of apples we can actually carry over to town B? The answer is no, but in order to arrive at this answer we must reframe the way we look at the problem.

Instead of one driver taking multiple trips, let's imagine that we have multiple drivers making one trip. There are 3000 apples, so at least 3 drivers must set out from town A, and they are eating 3 apples per mile. After $\frac{1000}{3} \approx 333$ miles, there are 2000 apples left, so we only need 2 drivers to take the remaining apples to town B. After another $\frac{1000}{2} = 500$ miles, there are 1000 apples left, so we kick out another driver. Finally, we drive the remaining 167 miles. The number of apples left when we arrive at B is $1000 - 167 = 833$.

To check that this reframing of the problem works, we can examine what happens in the original singledriver setting. The driver sets out from A with 1000 apples, stops when he drives 333 miles, and deposit 667 apples. He then drives back to A, and repeats this process twice more. This means we have gone from having 3000 apples at A to having 2000 apples at a point 333 miles closer to B. He can now repeat this process by driving from A to the point where the apples were deposited, and in 2 trips get 500 miles closer to B (now with 1000 apples left). Finally, he can take these 1000 apples and drive directly to B.